The DRILLER

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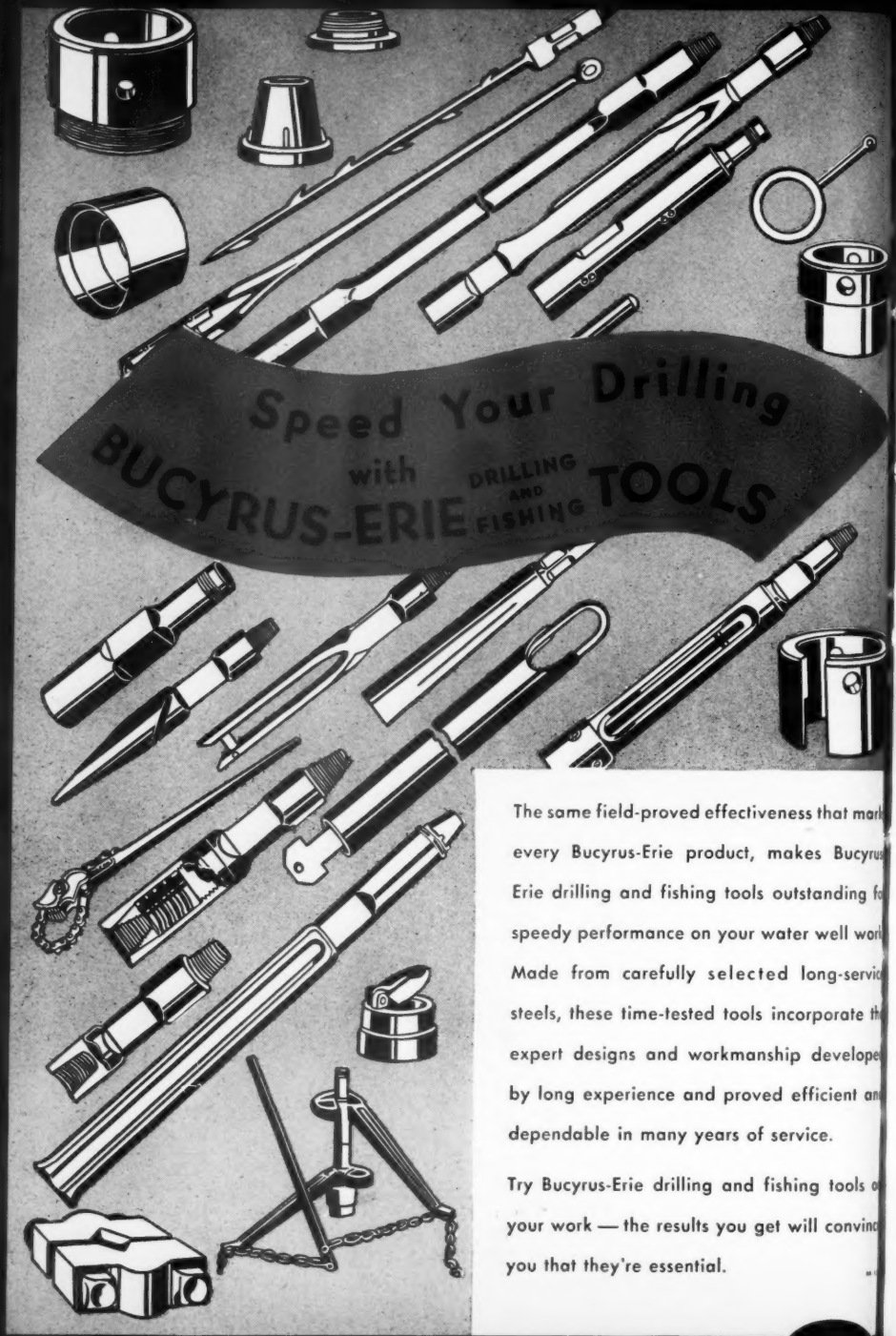

The same field-proved effectiveness that mark every Bucyrus-Erie product, makes Bucyrus-Erie drilling and fishing tools outstanding for speedy performance on your water well work. Made from carefully selected long-service steels, these time-tested tools incorporate the expert designs and workmanship developed by long experience and proved efficient and dependable in many years of service.

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3

Torpedoing Expert

Fifty-nine years of well drilling, shooting wells and installing pumping equipment have resulted in many tough jobs — some very trying and others quite humorous — for this New Jersey well drilling company headed by Samuel Stothoff, President, whose experience dates from 1886.

ALTHOUGH it happened some years ago, Samuel Stothoff of Flemington, New Jersey, clearly remembers about the incident of the hunt club well.

At the time, Stothoff recalls, he had a contract to put in a 600 ft. eight inch well for a Hunt Club near Wilmington, Delaware in a formation that was almost devoid of water. He urged the hunt club men in charge to discontinue drilling at this location and select another one some distance away, but they insisted on finishing at the contract depth of 600 ft. As only 5 gallons per minute were obtained in drilling, they then decided to have the well torpedoed.

Stothoff advised against this also because he was confident that there would be no benefits from shooting. Still insistent, a charge of 200 quarts of jellified nitroglycerine was used to no good effect—there was no more water in the well after the shot was made than before.

The members of the club, however, had a good time seeing the shot made and having pictures taken of both the first expulsion and also of the second, which were obtained by having two cameras set up when the shot was made. The Club members cheerfully paid the bill for the drilling of the well and the torpedoing, and everyone was reasonably happy over the event.

Incidents such as this have helped the Flemington driller maintain his reputation of being an expert in both the drilling and the torpedoing of wells. As President of the Samuel Stothoff Co., he has specialized not only in the drilling of wells and occasionally torpedoing them, but also in the installation of pumping equipment. His firm is a distributor for The Deming Company of Salem,

Ohio, and has made installations of many turbine, syphon, jet, and plunger pumps.

Liquid and Powder Explosive

Stothoff has torpedoed wells almost from the beginning and has used many types of explosives through the years. In 1911, for instance, he shot an eight-inch well at Mahwah, N. J., with an explosive known as Rack-a-Rock which was furnished in liquid and powder form. There was no transportation danger with this explosive which Stothoff and his men mixed on the job just before packing it into torpedo cans and dropping it into the well. Set off with electricity, as today, the 650 pound charge of Rack-a-Rock opened a vein that increased the flow of this well from three to 60 gallons a minute.

Later, Stothoff turned to regular 60% dynamite to shoot wells, but recently he has used jellified nitroglycerine, 100% strength, exclusively. With present government regulations calling for licensed workmen to handle explosives, Stothoff has found great convenience in turning the work over to the manufacturer who loads the torpedoes, transports them to the job, and makes the shot. This method results in improved efficiency for it places the responsibility of handling dangerous explosives on licensed specialists.

Starts Drilling at 14

Not that Stothoff does nothing but torpedo wells. Far from it. Actually, he has been drilling wells many years and when April 1st rolled around he had the distinction of celebrating two anniversaries: Easter Sunday and the start of his 60th year in water well drilling.

In 1886 Samuel Stothoff was only 14 years old when he went to work for his older brothers, Frederick and William, who a year earlier had started a well business in a small way. He remembers his entry into well drilling very vividly. "We used horse power and a bull wheel with a team of horses attached to a lever, and a tumbling rod running to the main shaft of the drilling machine. Those were the days we used what was known as the Pierce Jumping Jack rigs which were good for a maximum of 300 feet."

At the age of 21 Samuel joined his brothers in a partnership which continued until 1918 when it was dissolved and the new firm became known as Samuel Stothoff Company, Incorporated. His son, George B., now is connected with the firm and has been since his graduation from high school in 1927.

Stothoff remembers the time he had a No. 5 Non-traction Keystone mounted on iron wheels, and an old machine known as the Corbett Rig. As refinements in well drilling machinery were made, he gradually worked up to the Bucyrus-Erie machine— ". . . which we feel is one of the most efficient on the market." The machines used by the Stothoff

• The first expulsion from the Hunt Club well went 200 feet high.

firm at present include a Keystone and a Bucyrus-Erie 21-W which drill wells ranging from six inchers to 14 inchers and 100 to 1300 feet deep. Although the majority of Stothoff jobs are for suburban and residential wells, a good share of his annual business is in farm, industrial, and municipal work.

Stothoff's well drilling and pump installation work has carried him from the southern part of North Carolina through Virginia, Maryland, Delaware, Pennsylvania, Massachusetts, Rhode Island, Connecticut, New York, and up to the Canadian border. In the State of New York, Mr. Stothoff has encountered mica, gneiss, slate, trap, granite, limestone, sandstone, and many types of shale. In Northern New Jersey, formations of red shale, slate, limestone, granite, gneiss, baked shale, sandstone, and trap rock are found while the southern part of the state has stratified formations, sand, gravel, clay, marl, and hard pan. Stothoff uses Ever-dur screens to reach sand stratas bearing water.

Reaching 590 feet up, most of the rock, slush, and water was expelled during the second expulsion.

Mountain Job Takes 18 Months

From the number of years he has been in the business Stothoff can recall many tough jobs he experienced, but one he'll never forget happened in 1898. The job was a well for The Asusable Chasm Hotel, 445 ft. up in the Adirondack Mountains of New York. He had the misfortune of losing a complete string of tools in the second hole but moved his rig to the third spot—and lost a complete set of tools there, too! But, characteristically with Stothoff, he stuck the job out and finally finished with an eight inch fourth hole 445 ft. deep that pumped 40 gpm. The entire job took a year and a half to complete!

On another job, Stothoff had the problem of fishing 350 feet of six-inch pipe from an 800 ft. hole. In this instance, the pipe with its 5¾" x 36" brass working barrel had dropped 450 ft., telescoped the working barrel, and wedged itself very tightly in the bottom of the hole.

Luckily, the top of the pipe had a six-inch coupling so, Stothoff figured, a six inch nipple fastened to a 4 x 6 inch reducing coupling on the end of a four inch line of pipe would do the trick to fish out the pipe. He tried it, and after several attempts the nipple engaged itself to the coupling on the pipe in the hole. Stothoff solved the tough problem of lifting the entire line of heavy pipe by using two 50-ton hydraulic jacks for the 450 feet. Altogether, it took 30 days of hard work to fish the pipe.

Because of jobs like these, Stothoff

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Geophysical Logging

of Water Wells in Northeastern Illinois

By

CARL A. BAYS, Geologist and Engineer

and

STEWART H. FOLK, Associate Geologist,

Illinois State Geological Survey, Urbana, Illinois

Editor's Note: *Material for this series was from a paper presented to the Western Society of Engineers and published in its Journal for September, 1944. These articles appeared in THE DRILLER by special permission of the Western Society of Engineers and of the Illinois Geological Survey.*

FROM geophysical surveys and allied investigations some picture of the permeability of the producing formations in the deep wells has been obtained. The magnitude of crevice systems which provide rapid water transfer between closely spaced wells intersecting them has been recognized. From these data it has become evident that in many areas there are too many wells for stable water production under existing conditions of permeability. In one urban section where calculations based on permeability studies suggest an optimum spacing of one deep well per 900 acres, there is an area where wells are spaced one to approximately 60 acres. Rapid recession of water levels is reported during periods of high production. Determination of well spacing should be largely on the basis of the permeability of the sandstone aquifers which are everywhere present and have fairly uniform characteristics. Wells should be spaced on the basis of obtaining stabilized water levels within a few feet—both static and operating, a minimum of lift for producing wells. The demand, probable pumping periods, recovery periods, and much fundamental data form the basis for calculation of the best spacing in any area. Also there are many other factors of ownership and engineering which necessitate compromise in determining the actual spacing of wells. However, it is now possible to make recommendations of suitable spacing for new developments on a sound basis. Generally the tendency has been to put wells too close together and thereby to overtax local water resources, create a large local cone of depression, create irregular non-operating and operating water levels because of interference with near-by wells, and thus require continuous

VI

Geophysical Logging has contributed to the scientific determination of good well drilling procedures. In this concluding article of a series, well spacing, operating levels, and water temperature are discussed and a summary of the Geophysical Survey of water wells in Illinois is given.

lowering of pump settings, giving no permanence to water-supply installations. Wider spacing will eliminate these difficulties and obtain more permanent development of deep well water resources.

In one area, where about half-mile spacing for several wells in a war industry was used, a study of the data suggested a spacing of 6800 feet as optimum for the area. Later wells drilled at a spacing of nearly a mile gave higher yields and much more satisfactory operation during the heavy pumping season. Similar calculations can be made for other areas, and in cases where new developments are planned or reconditioning of old wells is considered, spacing merits consideration as a basis for such planning.

Operating Level

Analyses of geological and production conditions in wells in northeastern Illinois show that where there are several producing zones in a well the specific capacity is increased as the operating level is lowered. During the first part of the drawdown from non-operating to operating level in any well, a comparatively low specific capacity is to be expected. As the operating level is progressively lowered, different zones with successively lower hydrostatic heads begin to contribute to the well's yield. If the head, or the critical operating level for any zone can be determined in any well, then this zone's contribution can be controlled by controlling the operating level. This concept has two major important applications for planning of water wells.

1. If allowance is made for an increase in specific capacity with lower drawdown levels, pump settings can be planned at levels that are safe for operation under all conditions, and yet pumps do not have to operate against such great heads as might be necessary if the specific capacity for only the upper part of the drawdown were used. Setting pumps on this basis instead of that normally used will give savings in installation materials and costs of operation.

2. Certain of the sandstone zones in northeastern Illinois in the Franconia and Eau Claire formations are highly glauconitic. Glauconite is a complex hydrous ferric-aluminum-potassium-magnesium silicate with high base-exchange properties which

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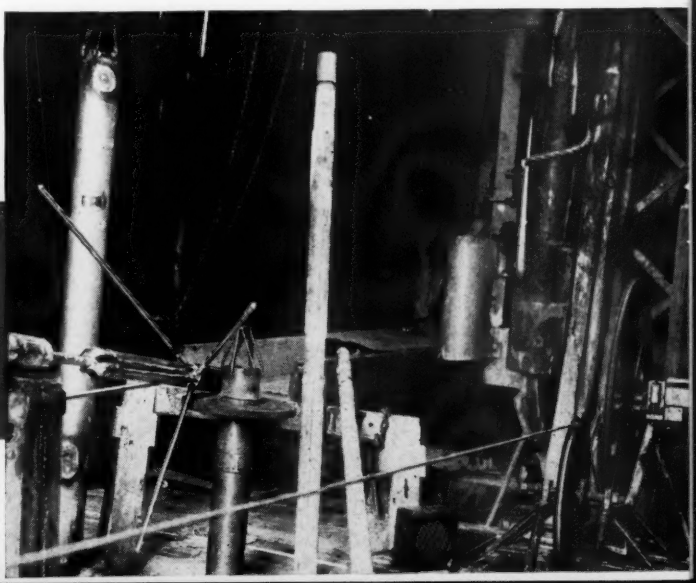

Logging tools shown here are (left to right): salter, caliper, current meter, thermometer, logging electrode.

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Scientific Gains Made In Drilling

THE application of science to the well drilling industry—as illustrated by the Geophysical Logging article concluding in this issue—is a clear indication of the progress the industry has made. The water well contractor no longer merely reaches water and attaches a pump. To complete a well today demands a variety of experience and knowledge — all highly specialized.

Customers soon learn the high plane of modern well drilling operations when the driller keeps a record of every foot of formation drilled through. The records verify his knowledge of local underground formations and water bearing stratas, and give to state geologists the "raw material" they need for compilation of geological data.

Operations are Specialized

Just drilling the hole is a specialized job, too, for it takes long on-the-job experience to acquire the required skill in running the rig, handling the tools, forging bits, analyzing the cuttings, etc. Like any skilled work, drilling cannot be properly learned from a book.

Not that formal education is a handicap. There are a number of graduate engineers in the field and their backgrounds, once practical experience was gained, have given them the advantage that application of sound engineering principles brings. But engineer or not, today's successful driller is a well-versed mechanic who watches his machine closely, maintains it properly, handles the minor repairs, and keeps rigs operating efficiently.

Drillers Progressive Businessmen

His familiarity with surface drainage and with pollution and contamination problems is a "must" in order to insure compliance with sanitary requirements. His knowledge of business methods must be complete enough to permit profitable operation. He must be familiar with legal principles to avoid staggering blows dealt by litigations that are the direct result of ignorance of the law. He must appreciate the advertising value of good work, well kept machines, and attractive signs, cards, letterheads, etc.

Men who have these diversified qualifications are helping the industry build a new era of progress. To continue the advance, future strides will depend on the degree to which science and the need of increased research for well drilling improvements are recognized.

IT FOLLOWS the High Lines

When the vast rural electrification projects get under way, demands for the Deming Jet Water System will skyrocket. Experienced well drillers with the *"know how"* to size up comparative advantages of competitive pumps will recommend "Deming Jets" on the sound basis of *worthwhile values.*

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PUMPS AND WATER SYSTEMS

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FROM THE MAILBAG

This page is open to any of our readers having questions to ask regarding drilling, driving pipe, dressing bits, etc. All letters will be answered promptly by experienced drillers and engineers who are qualified to give intelligent advice on these subjects. We will publish as many letters of general interest as space

Dear Sirs:

Do you know of a machine or instrument that will find water, a spring, or a good place for a sure artesian well?

L. D. Canada.

There are certain instruments and mechanical devices offered for locating underground water sources, minerals, etc., and some people seem to have magical powers in locating water by means of forked sticks, divining rods, etc. We, however, never got very enthusiastic about any of these although in instances results have been obtained and such practices cannot be ignored entirely.

We have known individuals who, by using a forked willow twig, have been able to locate underground water and in some cases very accurately. We cannot explain why a forked stick responds for some persons and not for others. Neither do we doubt the accuracy of instruments that have been used for this purpose.

Personally, we have always contended that the best way to locate water is actually to drill to the formation where water is likely to exist which may vary considerably in different localities, depending on the underlying formations, topography, etc.

In selecting the location of wells it is desirable, of course, to use reasonable judgment; that is, the well should be at the highest point consistent with the general layout and surroundings but in any case protected against surface wash. The well should be as far removed and in a direction opposite to the underground flow of any known or probable source of polution, as the layout of the premises will permit.

A well driller usually knows the best water bearing strata in his locality and therefore, is in a position to locate the well at the point where most likely it will insure a safe, pure water supply.

Sirs:

We are drilling twelve holes 425' deep and 13¼" diameter. We will drive pipe to 70' and then drill open hole in shale and fine soft sandstone. After we clean out the hole, we are able to drill the first foot in a few minutes, and then the rate of drilling slows down during the second foot and after drilling a total of two feet we have to stop and clean out the hole. The sand settles so rapidly that we cannot keep the bottom of the hole clean to do fast drilling. We have tried using ground clay, aquagel, and bentonite to keep the sand in suspension with no success.

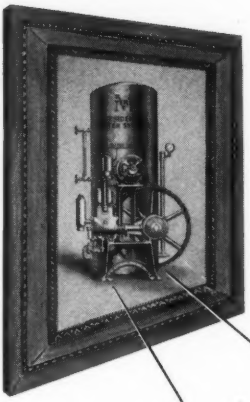
Is there any chance of a mud scow doing this work to better advantage by drilling and keeping the hole clean at the same time?

L. N. Indiana

Mud scow equipment is particularly adaptable for sinking large diameter wells in sand and gravel formation or where quicksand mixed with clay is encountered. It is not suitable for drilling in sand rock, shale, gumbo or sticky clay.

This system of drilling is used extensively in the southwestern states, particularly in Arizona and California. In these states conditions are ideal for its use and many of the large diameter irrigation wells are put down with mud scows used in

(Continued on page 14)



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NEWS OF THE MONTH

Water Storage Up

INCREASED ground water accumulation favorably dominated country-wide reports for February, a Geological Survey shows.

Snow-melt and floods, although not record-breaking, penetrated to water bearing stratas and generally effected very high water tables. Only water levels in areas affected by heavy pumping showed variations in response to changing rate of withdrawal.

Engineer Speaks At Jersey Meeting

A PRACTICAL demonstration of the operation of drilling equipment was given by A. C. Haisch, Bucyrus-Erie Company engineer, as the feature event of the New Jersey Water Well Contractors Association meeting April 5. The contractors met at New Brunswick, New Jersey.

Along with the demonstration, made with a scale model Bucyrus-Erie 29-T drilling machine, Mr. Haisch spoke on maintenance, care and operation of drilling machines and tools.

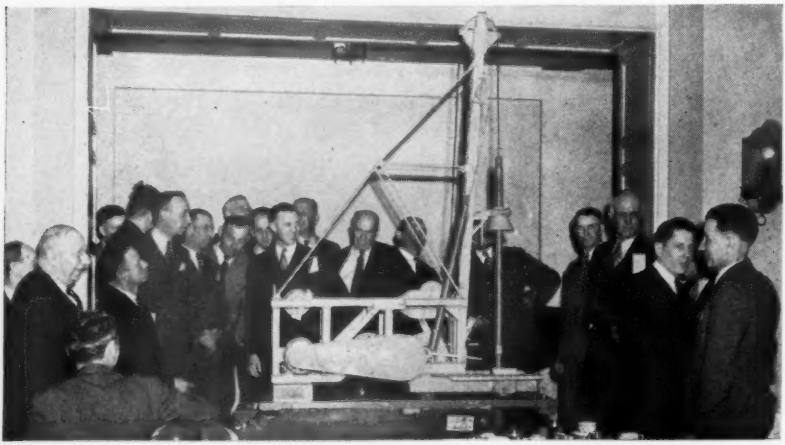
Although thoroughly covering the subject, Mr. Haisch was asked to answer several additional questions to conclude the lively meeting.

Drillers Discuss Sanitary Code

ADOPTION of a code of Sanitary Construction was the principal consideration at the recent Illinois Water Well Drillers meeting. The code was being prepared as standard by members of the Association, L. E. Workman, Service Secretary stated.

Continued bi-monthly meetings,

(Continued on page 21)



• New Jersey Well Contractors inspect the scale model Bucyrus-Erie 29-T.

The 4 Freedoms of Water Pumping

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Mailbag . . .

(Continued from page 10)

connection with solid cable tools where rock or any hard formation is encountered.

A mud scow is nothing more than a heavy flat valve bailer and is sometimes used with a bit bottom for breaking up the clay or packed sand. This bit bottom will not penetrate sand stone or any hard material.

In using the mud scow system, the tools are run in the hole, and the drilling motion started the same as when drilling with regular bit. The important thing is to have plenty of water in the hole to insure the scow working properly. Without plenty of water no one should attempt to use a mud scow. The water should be about three times the depth of the scow length at all times.

The machine should be set to operate with a shorter stroke and much slower motion than for ordinary drilling. The idea is to set up a pumping action in the hole by the operation of the valve in the bottom of the scow which agitates the material and forces it up in the barrel of the scow.

After running the tools a few minutes, they are pulled out without stopping the drilling motion thus not giving the material a chance to settle in the hole. When the tools are pulled from the hole, sufficient slack is let off the cable drum to allow the scow to lie on the ground horizontally. The usual procedure is then to hitch sand line on the bottom end of the scow and hoist up to dump sand out of the top end of scow. If the sand packs or sticks in the scow barrel, a hammer or other tool is used to jar it loose.

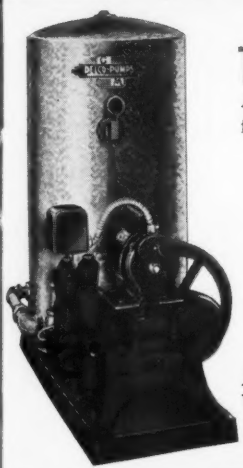
• Drilled in 1943 for the Newton Baker General Hospital at Martinsburg, W. Virginia, this F. N. Hagmann, Jr., 10 inch well 178 feet deep pumped 800 gpm. Drillers Jess Crouch and Sam Stephens found the well to have a static level of 18 feet and drawdown of 18 feet. Two blocks away a same diameter well 625 feet down yielded only 25 gpm while on the same project three other wells 350 to 400 feet deep produced only 250 to 300 gpm.

Unsuitable Mud Scow Conditions

When running a mud scow, it is the usual practice to have the outside diameter of the scow somewhat smaller than the diameter of the hole being drilled. For example in drilling a 13¼" diameter hole, you would ordinarily use a mud scow 11¾" O. D.

Usually in running a mud scow in sand or gravel formation, the casing will follow on down as the drilling proceeds without the necessity of driving. In the southwestern states where the mud scow system is employed quite extensively, hydraulic jacks are frequently used to force the casing or pipe down when it will not follow under its own weight.

In the light of your statement that you drill open holes, this indicates to us the conditions are not suitable for scow drilling and we doubt if it would be of any advantage to you. The best method we know of to get the cuttings in suspension is to use some kind of a clay mixture with Aquagel but it seems you have been doing this without any appreciable success.



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Geophysical . . .

(Continued from page 7)

make it ideally suited for a natural water-softener. Water from the glauconitic sandstones consequently is not as hard as that from other formations. A few establishments in northern Illinois take advantages of these underground water-softeners by casing off the overlying formations and producing water only from the glauconite-bearing zones. Unfortunately the yield of these zones is low, but it might be possible to utilize their water-softening properties and still obtain large well yields by proper well construction and production practice.

In one well in northern Illinois, it was noted that hard water was pumped all the time when the well was pumped continuously, but that much softer water was obtained when the well was pumped on alternate days. The geological explanation that can be offered is that when the well was pumped continuously it produced hard water from the Galesville sandstone, but when pumped intermittently the water levels during the rest periods were above the head of water in the Franconia sandstone so that water from the Galesville was fed into that zone and softened, and then when pumped the soft water was produced as the level was lowered below the head of the water in the Franconia. When the pressures of water in sandstones of the Franconia and Eau Claire formations in other areas can be determined, it is possible that by control of operating levels much softer water can be secured by use of the natural water softeners of these formations.

Temperature Gradients

It is well known that in most areas, except for a relatively shallow zone of annual temperature variation, the earth's temperature remains essentially constant at any given depth at any one locality and that the temperature increases with depth. In Northeastern Illinois the earth's temperature the year around at a depth of about 100 feet remains close to 50° Fahrenheit. Below that depth the temperature increases at approximately one degree for each 125 feet, which accordingly is considered the normal temperature gradient for the region. It is unusual, however, for the temperature log of a well to be a straight line having that gradient, for in most wells circulation and other conditions produce anomalies in the temperature logs. Nevertheless the bottom-hole temperature of most wells is that which

Summary

Geophysical methods have proved successful in solving many of the problems that arise in drilling, completing, and producing water wells. The geophysical surveys made of Illinois water wells and research in groundwater geology have furnished much factual material that when properly integrated, permits sound interpretation of groundwater phenomena and subsurface conditions. Such knowledge can be used to correct many of defects in old wells and to plan more intelligent developments and conservation of groundwater resources in the future.

As the investigations are continued it is expected that many of the questions in geophysical surveys and interpretations will be answered, and that new techniques and instruments can be developed for solving other problems in groundwater work, not only in Illinois but in many other areas where the same or similar problems are encountered.

would be expected for the depth on the basis of the normal temperature gradient, and the temperature of the water produced from each aquifer is close to that expected for the depth from which it comes. The normal temperature gradient can be used as a "rule-of-thumb" method for determining the greatest possible depths at which water of any desired temperature can be obtained.

Water for Cooling Purposes

Although it is evident that water from the shallowest aquifers will usually provide the most desirable water for cooling purposes, it is not uncommon to drill to increasingly greater depths to obtain large supplies of water for air conditioning and similar uses. Where cooling water is desired, glacial sands and gravels, which are widespread in buried valleys above the bedrock, should be sought as the best possible source. Next the crevice systems in the shallow bedrock formations should be tested, and only finally a deep well considered as a possible source of cooling water.

Where large quanities of cooling water are needed and inadequate sources are found in creviced or porous shallow limestones or dolomites, the probable increases in production from acidizing these zones should be considered. Recently in Kansas it was found that a shallow well in dolomites and limestone had its capacity increased four times by acidizing. Some water wells in Illinois have been treated with acid, but wider application of this method of increasing yields seems merited. Commercial acidizing services use nontoxic inhibitors particularly adapted to use in water wells, so that they will not react unfavorably on any of the well casing, liners, or equipment.

For profitable shallow well drilling. Macwhyte "Hi-Lastic" keeps the bit turning better on all types of formation . . . helps reduce tendency for the hole to get out of round, and for the bit to channel. You can carry tools higher, make a longer stroke, drill more hole at less cost. And "Hi-Lastic" is internally lubricated.

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Stothoff . . .

(Continued from page 5)

early in his career formed a business policy that has paid high dividends time and again in additional jobs, good will, and prestige in the industry. In his own words, "We have completed many difficult jobs and sometimes lost a lot of valuable time and money, but we do not make a practice of leaving a job until it is completed, although we have had a number of wells in which we were unable to obtain satisfactory supplies of water."

This policy, certainly a cardinal one, has earned for him very favorable publicity. Customers he served 50 years ago still come to Samuel Stothoff with new prospects and water well problems of all kinds so that today he is booked with orders six months in advance. Perhaps being kept busy through the years is the reason variety in the types of jobs handled seems to come natural with the Samuel Stothoff Company. The firm has drilled sump wells to help carry off surplus water and has drilled several blast holes. There also was the time they had the job of

• Samuel Stothoff has achieved records for many unusual jobs although most of his work is drilling suburban wells. Here his Bucyrus-Erie 21-W is shown making hole in 1941 for the Hunterdon Hills Playhouse, a theatrical group, near Jutland, N. J.

Why Drillers Recommend

JENSEN UNITS

It takes not only a good water well but a good pumping unit to make a satisfied customer. For that reason, many drillers never fail to recommend the JENSEN Water Well Pumping Unit. They have seen it make water CHEAP and DEPENDABLE for cities, camps, industries, public utilities, railroads, farmers, ranchers and many others throughout America. Bulletin No. 26 free on request. (Bulletin No. 29 in Spanish.)

JENSEN BROS. MFG. CO.

14th and Pacific Streets, COFFEYVILLE, KANSAS, U. S. A.

EXPORT OFFICE: 50 CHURCH ST., NEW YORK CITY, NEW YORK

• Deviating from well drilling and torpedoing, Samuel Stothoff erected this unusual double-headed tank for a Country Club.

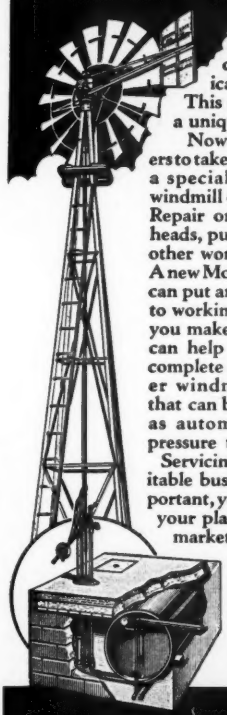
drilling holes to receive foundation piers. Instead of wood piling, iron pipe was driven down to the rock and filled with concrete.

Double-Headed Tank

A very unusual job was the double-headed water tank Stothoff erected for the Rumsen Country Club at Seabright, N. J. The unit consisted of two tanks, an upper one with a capacity of 50,000 gallons drawing water from a spring containing high quantities of iron. This tank and water was used for sprinkling purposes only. The lower tank, with a capacity of 20,000 gallons, obtained water from a well drilled in a stratified formation. The water from this tank was used for the club proper and for drinking purposes.

With headquarters remaining in New Jersey, the Stothoff firm continues to cover a sizable territory by operating, more or less, in New York, Connecticut, Pennsylvania, Delaware, and Maryland in addition to the home state. Modestly, Samuel Stothoff says, "We are restricted somewhat in our operations due to the war"—but it is certain that this drilling and torpedoing expert soon again will be working in many other states — post-war.

Windmill Dealers— Here's An Idea You Can Use!



Hundreds of windmills over the country are in critical need of repair. This situation offers you a unique opportunity.

Now is the time for dealers to take the initiative. Make a special effort to contact windmill owners in your area. Repair or replace windmill heads, pumps, cylinders, and other worn or broken parts. A new Monitor windmill head can put an old tower back into working condition. When you make a service call, you can help the farmer plan a complete Monitor Sky Power windmill water system that can be attached as soon as automatic controls and pressure tank are available.

Servicing windmills is a profitable business, but more important, you will be reserving your place in a great future market for farm water systems. The Monitor factory is ready to furnish you with parts and new windmills. Contact windmill owners now.

Monitor
SKY POWER
WINDMILL WATER SYSTEM
BAKER MANUFACTURING CO.,
EVANSVILLE, WIS.

WIT BITS

"It was at least ten feet long. I never saw such a fish in my life."

"That I can believe."

A man was attracted by frightened screams from a house. He ran in to investigate and found a frantic mother whose small boy had swallowed a quarter. Seizing the child by the heels, he held him up, gave a few shakes and the coin dropped to the floor. The grateful mother was lost in admiration.

"You certainly knew how to get it out of him," she said. "Are you a doctor?"

"No, madam, I'm from the Tax Collector's Office."

Courtesy: Rocky Mountain Oil Reporter

"Oil! Now what'll we do for water?"

Woman: "What's your cat's name, little boy?"

Boy: "Ben Hur."

Woman: "That's a funny name for a cat. How did you happen to pick up such a name?"

Boy: "Well, we just called him Ben until he had kittens."

"I'm glad I'm not a Russian."

"Why?"

"Can't speak a word of Russian."

Father: Why were you kept in at school?

Son: I didn't know where the Azores were.

Father: Well, in the future just remember where you put things.

"Dere Sirs: Pleez send me my money back. After taking six cans of yore corn syrup my feet ain't no better than they wuz."

In a civil service examination given in New York some time ago, one of the questions asked was the following:

"If a man buys an article for $12.25 and sells it for $9.75, does he gain or lose by the transaction?"

One of our modern young sweet things, with good looks unmarred by brains, after studying for a while, gave the following answer:

"He gains on the cents but loses on the dollars."

Mr.: "Do you suppose our son gets his intelligence from me?"

Mrs.: "He must. I've still got mine."

News . . .

(Continued from page 12)

proven highly successful, were voted for the coming year.

"Acidizing of Wells" was discussed by Dr. Carl A. Bays, Illinois Geological Survey, and Dr. T. E. Larson, State Water Survey. "Purpose and Effect of Zoning on Water Well Drilling" by Gene Boling of Cook County's Zoning Bureau and "Bacteria in Wells" by H. A. Spafford of the State Public Health Department also were subjects covered in the meeting.

Appoint Sales Head

THE MACWHYTE COMPANY, wire rope manufacturers of Kenosha, Wis., announces the appointment of R. P. Tyler as its General Sales Manager. Mr. Tyler was sales manager for A. Leschen & Sons Rope Co., and prior to 1940 was in sales and engineering with John A. Roebling's Sons Company.

New Well Resin

A MINIMUM of shrinkage and usability at any practical temperature is claimed for a new resinous compound just developed by Wilmington Chemical Corp., 10 E. 40th Street, New York, N. Y.

Forming an integral and uniform structure with rock formation and pipe, the resin assures water and oil resistance. Portions of the product are mixed on the job to adjust it to existing well conditions.

History Of Fitler

OVER one hundred and forty years of epoch-making growth are portrayed in "Fitler of Philadelphia" just off the press.

The book outlines the interesting beginning of the company in 1804 with the manufacture of a rope walk and its expansion into rope for sail boats, oil drilling cable, binder twine, and other cordage of historical importance. Old prints and photographs illustrate the book, free from The Edwin H. Fitler Company, Philadelphia, Penn.

About This Month's Cover Picture . . .

EVEN the photographer had little room to spare as he set up his camera to take this shot of a Bucyrus-Erie 21-W working in cramped quarters. The picture, taken from the only angle possible, shows E. C. Wehling and August Krueger putting down a six inch hole for a farm well near Beecher, Illinois.

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NAVY
There'll be a
BIG DEMAND
for these
"PUMPS by Aurora"
AURORA DEEP WELL TURBINES
are available in sizes of 4" to 24" for every pumping condition—oil or water lubricated. Streamline designed for highest efficiency and longest life.
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APCO Master-Line WATER SUPPLY SYSTEMS
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for SHALLOW WELLS
We also make all Kinds of Centrifugal Pumps and Jet Pumps
Write for Descriptions.
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58 Loucks St., Aurora, Illinois

BARGAIN COUNTER

To the reader who wishes to advertise used equipment in "Bargain Counter" Section.

[redacted] with your order. [redacted] preceding month. Ex- [redacted] issue closes December 10th.

advance. [redacted] check or money order with copy. Rate: 30c per line. Minimum charge $1.20. No discounts; no commissions. Read these instructions carefully. The average line contains 28 characters (20 characters if all capital letters are used). Count spaces and punctuation as one character each. Allow 10 characters for box number if blind advertisement is desired. Count your own copy to save delay. Holding up your advertisement one month to secure approval of revised copy or an additional remittance, may cost you real money in a lost sale. Be sure to enclose the

To the reader wishing to answer "Bargain Counter" Section advertisements appearing on these pages:

Be sure to address your inquiry to the advertiser by using the correct box number. Mail your letter in care of THE DRILLER, South Milwaukee, Wisconsin. Write each advertiser a separate letter. Do not write us for name and address of advertiser. This information will not be given out. We have no information about the equipment advertised other than that shown in the advertisements themselves.

DRILLS

Clipper drill, 1100' capacity, wood frame and mast. Waukesha 4 cyl. eng. mounted on 5 ton White truck nearly new solid tires. Includes 17'x14" stem, rope socket, 3-6" bits and wrenches, $1050.

Clipper drill 450' capacity, wood frame, steel mast. Buick 6 cyl. engine on 1½ ton Int'l. truck, pneumatic tires. Price without tools $1100.

Machines sheave equipped for manila rope. Can apply shock absorbers for wire line. Located in Ohio. Box 0535

1—21W Bucyrus Drill. Mounted on International truck. Both drill truck and drill in very good condition; rubber in good condition. Priced with or without tools. W. O. Goodwin Drilling Co., Baxter Springs, Kansas.

1—No. 85 Armstrong steel machine, LeRoi motor, Ford V-8 mounted, 6" to 8" drill tools. No cables. Now being overhauled. $1200. Box 0414

1—No. 70 all steel Keystone, mounted on GMC truck. Equipped from 6" to 8" dia., approx. 500' of drill cable and sand line. Overhauled, perfect shape. $2500.00. Box 0404

1—No. 34 Star (Wood), LeRoi motor on White truck. 200' drill cable and sand line. $1400. Box 0424

A good rebuilt drilling machine, semitrailer, steel frame, 40' wood derrick, 23' stem, 6" and 8" tools. 500' of ¾" cable and sand line. With Mack truck $1500. Box 0585

DRILLS

22 Star on steel wheels in perfect condition with tools. 2000 feet of ⅝ and ⅞ drilling cable and sand line. 150' of 2" new manila cracker. E. A. Read, North Clymer, N. Y.

Bucyrus-Erie 24-W. Purchased new June 1942. Equipped with spooling device, tool guide, blower, rubber set heel sheave, and speed sheave. Mounted on C40 Intern'l Truck, 5 forward speeds, 2 speed rear end. Rear duals 8.25x20, front 7.50x20. Truck carries drill excellently even in Tennessee mountains. With complete set of tools. Box 0555

No. 32 Star Drilling Machine. Mounted on 1927 Reo truck both in A-1 condition. Located in eastern Connecticut. Box 0525

Sparta 10 wood frame drilling machine, mounted on four solid rubber tired wheels. LeRoi motor. Derrick with shock absorber. Machine suitable for drilling wells to 8" diameter. In good condition. Has about 500' of drilling cable. Price $400. Box 0565

2 Bucyrus-Erie 21-W's. Each equipped with 4 single pneumatic tires and cables. With or without tools. First class condition. Box 0575

MISC.

One stem 3½" x 14', two sets jars, one swivel socket, all 2 x 3 x 7. Also Myers 24" stroke deep well head, excellent condition. Hall & Co., Box 388, Albany, N. Y.

WANTED

Well drilling machine. Truck mounting preferred. Write or wire the type, condition, location, price. C. B. Robertson, 4266 Lakewood Blvd., Long Beach, California.

Used well machine in good condition. Bucyrus-Erie 21-W, 33-W, or Armstrong 35. Please include information on price, equipment included, location of machine. Box 0432

Bucyrus-Erie 33-W, Keystone 70 or Star 71, truck mtd., with or without tools. H. Jones, Rt. 10, Fairfield, Conn.

One or two all steel drills, with or without tools. Give condition, age, size, lowest cash price. F. N. Hagmann, Jr., Vienna, Virginia.

HELP WANTED

Experienced well drillers and well drillers helpers for sand and rock work. Permanent all year steady employment. Good wages, time and a half for overtime. Write fully to Box 0545.

Drillers wanted for 33W's. Steady work. All the hours you want. Libby & Freeman, P. O. Box 2201, Orlando, Fla.

Competent driller for six inch water wells. Good pay, steady work. Edward Sanders, 226 Nelson Ave., Saratoga, N. Y.

TRUSTWORTHY AS TIME

It's the consistent, day-in and day-out performance of Cook Deep Well Turbine Pumps that has justified their choice by men "Who Know." For, the ONE thing no price list shows—no catalog illustrates—is the *priceless experience* of specially trained craftsmen who take pride in assuring you the closer tolerances . . . finer finishes . . . higher efficiencies for which Cook products are famous. In deference to this genuine, painstaking craftsmanship we don't strive to build *all* the world's turbine pumps—*just the best ones.* Send today for Cook Catalog 360-A, and be convinced. Oil or water lubricated.

In circle—*view of Cook Flanged Coupling showing heavy welded and bolted joint.* **Left**—*section through Enclosed-Shaft Turbine. Note streamlined, mathematically precise passage through impellers and bowls to give maximum upward thrust to water column.*

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